

ABSTRACT

Briefly described, methods of forming diamond are described. A representative method, among others, includes: providing a substrate in a reaction chamber in a non-magnetic-field microwave plasma system; introducing, in the absence of a gas stream, a liquid precursor substantially free of water and containing methanol and at least one carbon and oxygen containing compound having a carbon to oxygen ratio greater than one, into an inlet of the reaction chamber; vaporizing the liquid precursor; and subjecting the vaporized precursor, in the absence of a carrier gas and in the absence in a reactive gas, to a plasma under conditions effective to disassociate the vaporized precursor and promote diamond growth on the substrate in a pressure range from about 70 to 130 Torr.